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# COMMERCIAL AERONAUTICS

BY LT. CLIFFORD ALBION TINKER, U. S. N. R. F.

It is said that the man who invented spectacles was imprisoned for daring to improve on the eyesight that God had given us. Thus far no one has been imprisoned for saying that flying at one hundred miles an hour is already commercially practicable, although most bankers in this country have maintained a determined skepticism as to the fact. That attitude has retarded the development of commercial aeronautics so that today it is in its infancy, and, in the opinion of some, will never reach the convincingly practical stage until divorced from military considerations.

Yet commercial aeronautics is here, or hereabout, even if the bankers, as a class, will not see it. Perhaps those charged with the responsibility of obtaining these bankers' practical support have not studied sufficiently the bankers' side of the case.

An aviator flying over Washington's tomb on Memorial Day, dropping forget-me-nots, expresses a beautiful sentiment, and incidentally establishes his ability to fly; but he does not interest the financier. Not in the way required. No dividends appear in such an undertaking. Nor is it enough that the banker shall himself have taken a flight over his golf course, or down to the beach.

Again, the banker motors for a week-end in the country. He learns that eight young men in the small town which he visits were aviators during the War. Of these, one was shot down by the enemy, four are home again; and he inquires:

"What of the other three?"

"Oh, they fell, and were killed."

This reply does not make less dormant his enthusiasm for commercial aeronautics.

We are too close to the War to forget the long list of fatal accidents, though the rush of getting ready necessarily produced some defective equipment, and the training of more than 18,000

aviators in eighteen months was bound to result in numerous casualties. The process was expensive in lives as well as money. The same number of machines, the same hours of flight, and the same amount of training in peace-time aeronautics would tell a different story.

Take as an instance the daily flights between London and Paris. The service has recently rounded out its first year with the record that out of 1,535 flights scheduled 1,444 were completed. The director, G. Holt Thomas, though not particularly sanguine in some respects, points out that although the air route between London and the Continent is one of the worst, climatically, in the world, only eighty-three air journeys during 323,355 miles of flying were prevented by weather.

"This should not," Mr. Thomas explains, "be taken to mean that flying was prevented altogether on as many as eighty-three days. Half a dozen machines are often scheduled to depart at various times during the day; and, whereas weather conditions may cause a flight in the morning to be abandoned, it may be found perfectly feasible to get machines away during the afternoon. Thus, even on a day when the weather is very bad, only one, or perhaps two, flights out of, say, six, need to be cancelled."

There were only two deaths during the year on this service. It would be impossible to find any other method of transportation equalling that record for the distance traveled. It is natural to think of the airplane as a frail vehicle, unreliable mechanically, and yet the London-Paris Airco Express has proved that less than six of its 1,535 scheduled flights were prevented by mechanical defect, and only about thirty were interrupted through any forced landing while en route. When Mr. Thomas started the London-Paris service he ventured the prediction that in their first year's flying they would attain about eighty per cent efficiency. Actually, it has worked out, in round figures, to ninety-four per cent.

In this country almost everything necessary to the beginning of a successful era of commercial aeronautics awaits the support of the banking interests. But a banker must be approached for funds for commercial aeronautics in exactly the same way that he is approached for money to establish any other commercial

enterprise, such as cotton mills, railroads, steel mills or shipping. A carefully analyzed bill of particulars must be prepared, detailing the costs and methods of manufacture, the cost and method of operation, the source of revenue and the dividends estimated.

Airplanes must land, and we have no landing fields. Airplanes and airports are more vital to commercial aeronautics than are harbors and docks to a merchant marine. Ships may anchor at will. Airplanes must come down. Even a banker knows this. To be sure, there are a few municipal landing fields scattered throughout this enormous country but they are so few and of such indifferent character that, speaking broadly, every time an aviator takes off the ground he is placing himself in a position analogous to that of the "Flying Dutchman": he must fly on forever. It is not really as bad as this, but many bankers think it is.

One reason—perhaps the chief reason—that we have no prescribed air lanes in this country, and having no air lanes have no landing fields, is that we are still at war with the Central Powers. Because we have not signed the Peace Treaty and the Versailles agreements we have not in this country adopted the aerial rules and regulations of the Allied Powers. Failing to do these things, we also have not formulated or made available or obligatory any corresponding rules of our own.

And yet, even in this country, we are now entering an era of commercial aeronautics. A few financiers are beginning to look with favor on certain commercial features in which aircraft play the leading part. Meantime, military and naval men in England, France, Italy, Germany, Japan and the United States control the design and operation of aircraft. Even the manufacturers are employing engineers whose greatest effort in the field was made in developing war craft. They held important positions in the military and naval forces of the nations enumerated, and they are still thinking along military and naval lines today. The United Air Service of England, France and Italy, with the possible exception of France, are holding back commercial aeronautics in those countries. Aircraft designed to carry protective armor, and equipped with devices for attaching arma-

ment, such as machine guns, small cannon and bombs, is handicapped by the weight of these adjuncts.

The difference between machines with and without these adjuncts is the difference between profit and loss to any concern undertaking commercial work and employing aircraft. Military and naval considerations require planes of peculiar types; the observation plane, the pursuit plane, the attack plane and the bombardment plane, while commercial aeronautics must follow an entirely different line of development. Passenger and freight-carrying capacity are the considerations.

It is not too much to say that at the present time there has been designed only one plane primarily for commercial use: that is, the Giant Caproni, of one hundred passenger capacity, now in a hangar in Italy. It has never been tested. The reason is that the military authorities controlling Italian aviation have never given permission for it to leave the ground because Caproni did not include certain features which would permit his plane to be converted to military use.

Before the World War aeronautics were in the experimental stage. They are still in the experimental stage; but the fundamentals are not only well known, but have been tested in actual practice for a long enough time to establish firmly their truth and reliability. The impetus given aeronautics by the War is equal to what twenty-five years would have shown in any other mode of transportation. But aeronautics are bound up so compactly with military and naval usages that the birth of commercial aeronautics has been temporarily postponed. Yet our aerial mail service is the most extensive in the world and is proving to be the most economical method for transporting our mails. We have largely determined, as stated above, the fundamentals of aeronautical design; what remains is the adaptation of aeronautical design to the requirements for passenger service, and express and freight carrying.

Airships appeal to the general public as a means of travel above any other type of aircraft. Greater personal comfort is found in them than in an airplane. The immense size of an airship gives to the passenger freedom of movement. In the airships of today there are staterooms, lounging rooms, dining

saloons, and sight-seeing compartments. It is not enough to say of airships now under design for transoceanic and transcontinental lines that they will eliminate dust and at least one form of sickness. These airships will have all the luxury of an ocean liner with five times her speed.

Unless experts are dreamers, the traveler by airship from New York to London in the next few years will reach his destination in two days. He will leave New York at an altitude of 2,000 feet and after a last fond glance at the shimmering waters of the bay and the tiny Woolworth tower, will settle himself to enjoy the trip in extremely comfortable and cheerful surroundings. The ship will be electrically lighted. There will be electric stoves in the galley and a searchlight will mark the path of the giant craft as she threads her course between sky and sea.

The passenger list may comprise four hundred persons, some of whom will dance, play games or attend moving picture shows. Others will listen to the opera in New York which will reach them by wireless telephone. Now and then a page will call the name of a passenger wanted on the wireless telephone by his office in New York. The crew will go about their business in uniforms designed to provide warmth and freedom of movement. Their watches will be divided into four hours each with the dog watches intervening.

A writer in the *Air Service News Letter* says that such conditions as described above will prevail in less time than one might imagine. The traveler on such a ship will want, before retiring, to stroll along the keel corridor for nearly eight hundred feet. Above him will be the gas bags, resembling the ghosts of clouds. There will be row after row of gigantic gasoline tanks and oil reservoirs with huge water ballast bags suspended here and there above them. This vast array of supplies will be connected and interconnected so that the trim of the ship may be maintained at all times and the control will be exercised from the navigating compartment.

There is being formed in the United States an organization of recognized mechanical and financial strength to manufacture and operate a fleet of just such gigantic airships for transcon-

tinental air lines, to be employed in passenger, freight, express and mail traffic.

Minor organizations are now under way for operating with airships of the non-rigid or blimp type in this country, and from this country to neighboring ports in the Caribbean. One concern intends to operate between Key West and Havana, and along the coast from Key West to New York; also from New York to Chicago, with intermediate stops at Washington or Pittsburg, or the Lake Ports. Another corporation is embarking on a lighter-than-air enterprise between Detroit and Cleveland.

Other corporations are either operating, or planning to operate in the near future, heavier-than-air traffic lines between Key West and Havana, and along the Atlantic Coast; also across the continent from New York to San Francisco, on the Great Lakes, and on the Atlantic Coast from New York to Boston, and one giant seaplane has recently flown from Key West to New York in less than fifteen hours. These are a few of the indications that we are entering the era of commercial aeronautics.

To enumerate all the uses to which the airplane is adapted, and the uses to which it has been put within the last twelve months, would make an astonishing list. Some of the major achievements during the past year which are contributory to the needs of the public at large are as follows: Forest fire patrols by both airplanes and seaplanes; fish patrol scouting, whereby the catch of certain fish of the gregarious type, given to schooling on the surface of the ocean, has been increased from 100 to 3,000 per cent; coastal survey by photographic methods from airplanes; railroad line location by aerial reconnaissance, cattle ranching, and the detection of lost herds and individual cattle, and great pioneering exploration projects, such as the New York-Nome flight conducted by the Army Air Service. The reliability of planes for all kinds of ferrying and commuting, for carrying funds, precious stones, valuable mail and documents, investigating remote areas, the making of astronomical observations, for aerial advertising, sight-seeing, and last but not least, the aerial ambulance, a twentieth-century-life saving messenger, has been clearly demonstrated.

Adjuncts which are necessary to aerial navigation must be supplied by the Government in exactly the same way as are lighthouses, coast guards, radio compass and other aids to mariners. In addition, there must be an expansion of Government meteorological observation, with the accompanying dissemination of data. These are governmental functions, and are not within the province of State or community undertakings. There must be created by law a bureau or commission of aeronautics, having the control of commercial activities, insofar as the public safety and welfare are concerned. This means not only the licensing of the manufacture of aerial machines and equipment, but the licensing of pilots and the laying down of rules and regulations for day and night traffic, to safeguard the interests of the population at large.

Great distances are so speedily covered through the air that forty-eight separate controlling bodies or State Commissions would be a nuisance or a liability rather than an assistance to commercial activities. It is plainly the duty of the Government to establish aerial lighthouses along the major air lines, fog gongs or other auditory signals in those sections of the country where fogs are prevalent; landing fields with repair base facilities; in fact, before commercial aeronautics can be anything but sporadic, the Government must give full and complete assistance along these several lines.

But it should not go further. In other words, the adjuncts to aerial navigation are governmental, while the manufacture and operation of the machines themselves belong to the realm of finance, as in the case of any other means of transportation or communication.

Commercial aeronautics is a matter of common sense, like any other business having to do with the welfare of the people at large. Navigating through the air is similar to navigating the sea, and aircraft must be supplied with meteorological information, not only in their immediate vicinity, but along the route well in advance of the schedule of any particular flight, because of the great speed attained by all types of aircraft.

This is fundamental. However, the common thought that aircraft can fly only in pleasant weather is entirely erroneous.



A squadron of six airboats attached to the Atlantic Fleet last winter and spring cruised for nine months, covering thirteen thousand miles in weather which at times forced surface craft to seek the shelters of harbors or put to sea for safety. Machines capable of attaining a speed of one hundred miles an hour and upward will be able to gain ground in any wind except a typhoon. Likewise, they will be able to navigate either around or above local disturbances. They are doing it every day. Only the most violent meteorological disturbances delay aerial activities, and then only for a short period.

Considering the comfort of passengers in aerial transportation, it may be said that where passenger space is enclosed in heavier-than-air machines, electrically heated, luxuriously upholstered and furnished with oxygen apparatus for high altitudes, flying over mountain territories or to escape local storms, the discomfort can only be one of monotony of position, which in the large types, sure to be developed in the near future, will be removed.

Air sickness will probably always trouble certain individuals, but so few are thus affected that the matter has no bearing on the future development of aerial transportation on a grand scale. Reliability of machines and equipment is not well understood, but it may be said with absolute truth that the all-metal planes are nearly fool-proof with respect to the machine itself, the great danger being in connection with the use of gasoline as a fuel. Probably ninety-five per cent of all the accidents where fire occurs are due to defective supply systems from the fuel tanks to the motors. It would appear that insufficient thought has been given to this part of the mechanical equipment of airplanes.

In the case of airships, helium will replace hydrogen, but that is not so necessary as the control of the gasoline supply. In airships and in heavier-than-air machines sprinkling systems can and will be installed, which will reduce the danger of fire in the same manner as is done by sprinkling systems in factories.

And then there are the crews. Relief pilots must be carried, so that the fatigue of long sustained flights shall not incapacitate the pilot to such an extent as to make landings dangerous.

The multiple power plant is receiving the best attention of designers. The planes depending on a single engine, or even

two engines, for sustained flight, are more likely to meet trouble than is a plane provided with three or four motors. The extra motors provide a factor of safety.

To sum up: Commercial aeronautics on a large scale, particularly in this country, on account of its area, should have no terrors for financiers. It can be nothing less than a paying proposition. Of first importance in the field of commercial aeronautics is the airship for long distance traffic, passenger or freight. Next come the airplane and seaplane, for distances up to three or four hundred miles, and relays of any distances, to include the circumnavigation of the globe.

Designs must break away from military and naval considerations. The Government must establish laws and regulations for safety's sake, and to avoid confusion with respect to responsibility, and must further provide all the aids for navigation which the peculiarities of aeronautics require; must provide public landing fields and supply bases, regulated and controlled by Government agencies; must materially extend the functions and activities of the meteorological service, and thus indirectly subsidize commercial aeronautics in the same manner in which merchant shipping is subsidized, not by cash bonuses and direct cash payments to concerns and individuals, but by the establishment of a public service having cognizance of aeronautical matters.

Finally, bankers must come to the aid of the aeronautical industry, and to the aid of corporations undertaking the operation of aircraft for commercial uses. It goes without saying that any exploitation of transportational facilities must be founded on a solid financial basis. Otherwise, its economic life will be short. Aeronautics is here—and will be to the end of the world; and the bankers are here. The problem is to bring them together.

CLIFFORD ALBION TINKER.